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PROJECTIONS OF THE U.S. POPULATION OF 18-YEAR-OLD MALES IN THE --ETC(U)
MAR 78 J BORACK, M GOVINDAN

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PROJECTIONS OF THE U.S. POPULATION OF 18-YEAR-OLD MALES IN THE POST-1993 PERIOD

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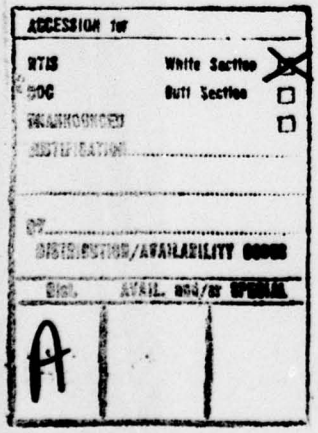
J. Silverman



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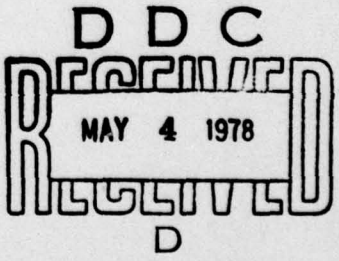

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With the advent of the all-volunteer force, it is necessary to estimate the long-term supply of individuals available for military service to determine our ability to meet future manpower requirements. Planners must be able to forecast both the size and composition of manpower supply because of the lead time necessary to take corrective action in areas such as recruitment strategies, training policies, hardware and job design, necessary legislation, etc., whenever there are critical imbalances between projected supply and requirements.

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The primary manpower pool for the military is comprised of young men 17-21 years old. This report discusses a forecasting methodology based upon asymptotic exponential regression that may be utilized to obtain projections of this population in the post-1993 period. Specifically, a methodology is presented to obtain projections of the 18-year-old male population. Extension to other age groups is straightforward. Projections obtained by this methodology are compared to Bureau of the Census population projections and actual post-period estimates. The methodology is shown to be an interesting alternative to other projection techniques.

FOREWORD

This development was conducted in response to Navy Decision Coordination Paper, Manpower Requirements Development System (NDCP-Z0109.PN) under subproject PN.02, Long-Range Manpower Supply Forecasting. The objective of the subproject is to identify and measure those variables and interrelationships that define the national supply of manpower eligible for Navy recruitment from 5 to 25 years beyond the Five Year Defense Plan. An earlier special report (Govindan, Note 1), entitled Manpower forecasting: Problems in forecasting the long-range supply of military manpower, documented the findings of a literature search and led to the projection model developed herein.

Appreciation is expressed to Professor Sar Levitan and Sheldon Haber of George Washington University and to Stephen Sorensen and William J. Moonan of the Navy Personnel Research and Development Center for their helpful suggestions.

The results of this study are intended for use by hardware and manpower planning offices concerned with the long-range availability of military manpower.

J. J. CLARKIN
Commanding Officer

SUMMARY

Problem

With the advent of the all-volunteer force, it is necessary to investigate the long-term supply of qualified young men and women in order to assess our ability to meet future manpower requirements. The United States Bureau of the Census has recently released projections of the number of young men between the ages of 17 and 21, the pool from which most military manpower has been drawn. These projections display substantial uncertainty after 1992; that is, after those not yet born reach the ages of 17-21.

Objective

The objective of this effort was to develop a methodology to provide accurate projections of the overall supply of young men for the period of substantial uncertainty; that is, to project the supply of 18-year-old males for the period 18 years and beyond the date of projection.

Approach

The population projections of future 18-year-olds obtained in this report are based upon the assumption that the yearly fertility rate pattern in the near future will exhibit behavior similar to that observed during the recent past. Specifically, a short-range asymptotic trend model based upon the number of males under 1 year old per 1000 women aged 15 to 44 was developed. This model was then utilized to project the number of males under 1 year of age for a 5- to 6-year period thereafter. Historical survival rates were then applied to these projections to obtain projections of the number of 18-year-old males 18-22 years from the date of projection.

To assess the accuracy of this technique, the parameters of the model were estimated on the basis of data derived during the period 1965-1969 and projections of the number of under 1-year-old males during the period 1970-1975 were obtained. These were compared to both the actual data for this period and to Census Bureau projections made during 1970.

Results

The short-range asymptotic trend model of males under 1 year old per 1000 women aged 15 to 44 was calculated for the years 1965-1969 and 1971-1975. Projections obtained from the 1965-1969 model over the years 1970-1975 yielded results with mean absolute error of 12 percent when compared to actual Census Bureau population estimates. This mean absolute error is smaller than that obtained when using the Census Bureau's 1970 middle (Series C and Series D) projections. Series C provided projections whose mean absolute error was 22 percent; and Series D, those whose mean absolute error was 13 percent.

Projections of the population based upon application of the asymptotic regression model to 1971-1975 data yield results indicating that the number of U.S. males will have declined by 27.9 percent as of 1994. This decline is projected to 23 percent in 1998, a more moderate level. These projections are more pessimistic than those offered by the Census Bureau.

Conclusions

Projections of the short-range asymptotic fertility trend model indicate that the size of the U.S. population of 18-year-old males will remain relatively low throughout the period 1994-1998. When compared with Census Bureau projections based upon low, moderate, and high fertility rate assumptions, the short-range asymptotic model yields figures that are somewhat more pessimistic for manpower planners. The difference in the results obtained by the Census Bureau and the asymptotic trend model is due to the difference in the assumptions made by each. Based upon comparisons of projections of the 1970-1975 period with actual post-period estimates, the asymptotic trend method of projection is a reasonable alternative to Bureau of the Census methodology.

Recommendations

The methodology explored in this report should be seriously considered by manpower planners and forecasters when developing projections of future qualified military manpower supply and enlistments.

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INTRODUCTION

Problem

With the advent of the all-volunteer force, it is increasingly important to be able to estimate the long-term supply of service qualified young men and women in order to assess our ability to meet future manpower requirements. Planners must be able to forecast long-range manpower supply characteristics because of the long lead time necessary for taking corrective action when critical imbalances between manpower supply and manpower needs are projected.

The United States Bureau of the Census has recently released projections of the male population for the period 1975-2050.[1] The Census Bureau projects a decline in the size of the primary military manpower supply pool (young men 17-21 years old) of approximately 27.9 percent until 1993--after which an upturn is projected. However, the Census Bureau projections of this age group display considerable uncertainty after 1992, since they include counts of individuals not yet born as of the date of projection. For example, 1975 projections of the number of 17-year-old males in 1993 include individuals unborn as of 1975.

Objective

The objective of this effort was to develop methodology to provide accurate projections of the overall supply of young men 17-21 years old for the period of substantial uncertainty--that is, beyond the point where the births of these individuals have actually occurred. This methodology will provide a basis for short-range projections into this period of greatest projection uncertainty.

Background

Census Bureau projections of the 17 to 21-year-old population are summarized in Figure 1. Note that the three projection series display substantial uncertainty after 1992; that is, after those not yet born and counted reach the ages 17 to 21. These projections are based upon explicit assumptions regarding mortality, immigration, and fertility. By far the most significant component in population change and the most difficult to predict is fertility (U.S. Bureau of the Census, October 1975, pp. 1-5). Consequently, the variability in the three projection series arises from uncertainty over assumed fertility rates in the next few years. The other two components of population change, mortality and immigration rates, have been historically very stable and are held constant in all three projection series displayed in Figure 1 (U.S. Bureau of the Census, October 1975, p. 25).

As the Census Bureau states, "population projections are 'correct' by definition (except for computational errors) because they indicate the population that would result if the underlying assumptions should turn out to be correct. Thus, without an evaluation of the assumptions, there is no basis for choosing among alternative projections" (U.S. Bureau of the Census, October 1975, p. 14).

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[1]U.S. Bureau of the Census, Projection of the Population of the United States 1975-2050; Current Population Reports, Series P-25, No. 601, October 1975.

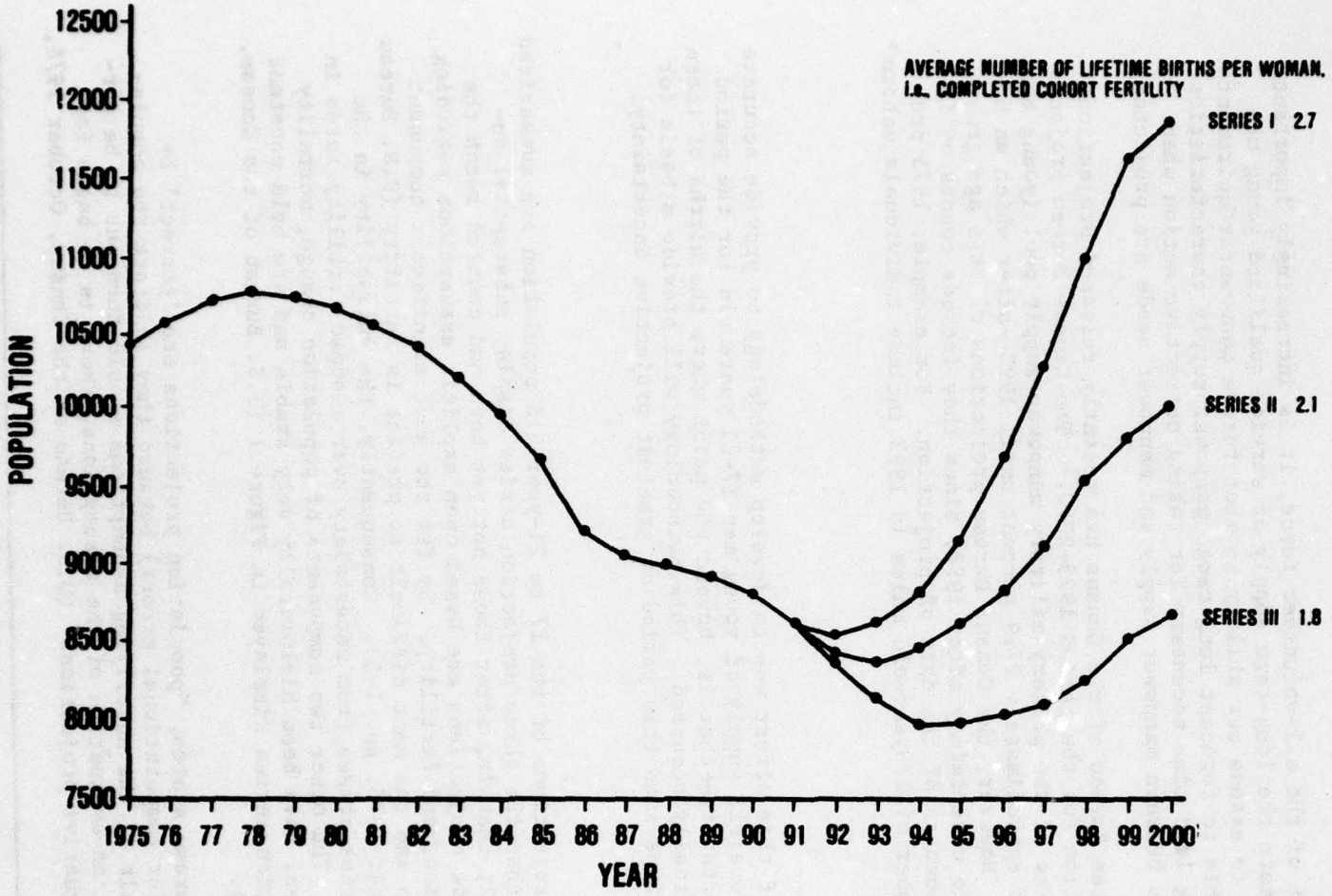

Figure 1. Estimates (in thousands) of U.S. male population age 17 to 21, including armed forces overseas, 1975 to 2000 (from U.S. Bureau of the Census, October 1975, Tables 7-9, pp. 41-118).

The assumptions underlying the Census Bureau's projection methodology are summarized as follows:

> In selecting the ultimate cohort fertility assumption for Series II, two general approaches were considered.
>
> The first approach focuses on the long term and excludes consideration of past trends in fertility. Population growth obviously must cease at some point in the future; the difficult questions concern when this will occur, at what level, and by which path zero growth will be reached. (This does not preclude the possibility of population decline after zero growth occurs.) Although the average level of cohort fertility could differ somewhat from replacement level over an extended period of time, especially when combined with an assumption of substantial net immigration or net emigration, an ultimate assumption of fertility at replacement level appears reasonable; however, the question of when to assume that replacement level fertility is reached remains open.
>
> The second approach focuses on fertility prospects in the near future. In this regard, survey data collected annually from 1971 through 1974 on total births expected by young wives suggest that their completed fertility will be around replacement level. Birth expectations data are subject to error and to change, and the completed fertility of these young wives could be higher or lower than indicated; however, at present, it does not appear that their fertility will differ greatly from replacement level.
>
> In brief, the two approaches suggest that for Series II it is reasonable to assume an ultimate cohort fertility rate at the replacement level figure of 2.1 and cohort fertility around replacement level commencing with women presently in the young childbearing ages. . . . The three main projection series assume that fertility rates will move smoothly toward the assumed ultimate levels. It is of course possible that fertility could reach replacement level in cohorts presently in the young childbearing ages and then fluctuate in subsequent cohorts.
>
> The Series I and Series III assumptions reflect an attempt to provide a reasonable range around the Series II assumption. Ideally, this range would reflect a specified statistical confidence interval; however, as this is not possible, . . . the Series I, Series III assumptions can be described as "providing a one-child range that at this time appears likely to include future trends and fluctuations in fertility."

> The Series I assumption . . . was set further above the Series II assumption than the Series III assumption . . . was set below the Series II assumption. This choice reflects the idea that for average fertility to drop much below 2.0 births per woman, there would have to be a change in the prevailing social norm which favors at least two children per family and/or in the social and economic factors determining adherence to this norm. . . . Ideally the Series II assumption could be described as "most likely"; however, given the uncertainty about future fertility, the Series II assumption is more accurately described as appearing at this time to be a reasonable choice. (U.S. Bureau of the Census, October 1975, pp. 21-22.)

This report will develop an alternative set of assumptions that may be better suited to the short run than those of the Census Bureau and may therefore serve as the basis for more accurate projections of male 17 to 21-year-olds. These new assumptions were fostered by the following questions about the Census Bureau's assumptions.

1. Why should an ultimate assumption of fertility at replacement level in the long-term appear reasonable in the short term?

2. Why should "consideration of past trends . . . be excluded?"

3. Why is it that "population growth obviously must cease at some point in the future?"

4. Why is so much faith put in fertility <u>expectations</u> of surveyed women and none in the past trend of <u>actual</u> fertility behavior?

Govindan (Note 1) included a search of the literature regarding the determinants of fertility, methods for its projection, and data availability. The search indicated that:

1. With regard to the determinants of fertility, we do not as yet have a theory, either economic or sociological, that can explain changes in fertility trend. We do know that:

a. The effect of income on fertility has not been found to be consistently negative nor positive nor of much magnitude in either direction.

b. Major fertility changes do not appear to be influenced by business cycle indicators, but surface deviations from trend do appear to move in the same direction.

c. Increases in the cost of the wife's time tend to reduce fertility.

d. There appears to be a significant inverse relationship between cohort fertility and cohort size. The explanation for this is still conjectural.

e. Based on sociological research, there appears to be a relationship between fertility decline and a number of factors, generally described in State III of the "Demographic Transition Theory." These factors include the rise in women's education, and the rise in their labor force participation rates. But these have not been tied together sufficiently to permit accurate, predictive extrapolations.

2. With regard to methods of estimating future fertility, the Census Bureau's surveys of the lifetime fertility expectations of 18 to 24-year-old married women is sometimes a poor predictor of subsequent actual fertility behavior. The survey is also substantially weaker in the short run than in the long run because it does not control for variations in the timing pattern of fertility, but only for completed lifetime fertility of surveyed women. A more appropriate survey would be of the fertility expectations over the next 3 or 4 years.

Due to this lack of an agreeable theoretical technique for forecasting fertility rates, this report derives population projections of 18-year-old males based upon the assumption that trends in fertility will continue in the short run (over the succeeding 5 years) as they have in the recent past. That is, the underlying causal conditions of fertility behavior are assumed to behave in the near future as they have behaved in the recent past. A discussion of the projection methodology used in this report is described in the following section.

APPROACH

This chapter describes a short-range fertility model that was used to derive projections of the 18-year-old male population 18 or more years from the date of projection. The model assumes that recent trends in annual births will continue into the near future.

The number (in thousands) of U.S. males under 1 year old as of 1 July of the years 1965 to 1969 was 1917, 1812, 1757, 1718, and 1742 respectively (see U.S. Bureau of the Census, Series P-25, No. 519, Table 1). The number (in thousands) of women in the U.S. population of child bearing age (15 to 44) for the same years was 39,058, 39,709, 40,392, 41,101, and 41,839 respectively (Ibid). Based on these figures, the number of males under 1 year of age per 1000 women of childbearing age for the same years was 49.08, 45.63, 43.50, 41.80, and 41.64 respectively.

A graph of this data is presented in Figure 2, which indicates that the data for the period 1965-1969 exhibit a pronounced curvilinear downward trend. In order to model this process so that it will both accurately fit this series of past data as well as maintain consistency with Census Bureau assumptions of smooth movement to an ultimate fertility rate (see U.S. Bureau of the Census, Series P-25, No. 601, pp. 2-5), an asymptotic exponential model was chosen. This model is mathematically represented as (see Stevens, W. L., 1951):

$$Y = \alpha + \beta\rho^{x} + e \qquad (1)$$

where

Y = number of males under 1 year of age per 1000 women of childbearing age,

x = year (1 = 1966, 2 = 1967, etc.),

α = asymptote of process,

β, ρ = model parameters, and

e = error term.

Unlike Census Bureau methodology, the procedures used in this section are based entirely upon past trends and not upon a survey of birth expectations. Assuming the model to be appropriate, a bonus derived from this new methodology is an estimate of α, the asymptote, which is an indication of where the process is heading in the long term if recent trends continue.

Fitting the data of Figure 1 to mathematical equation (1) yields the following estimated relationship:

$$\hat{Y} = 40.379 + 14.675(.595)^{x} \qquad (2)$$

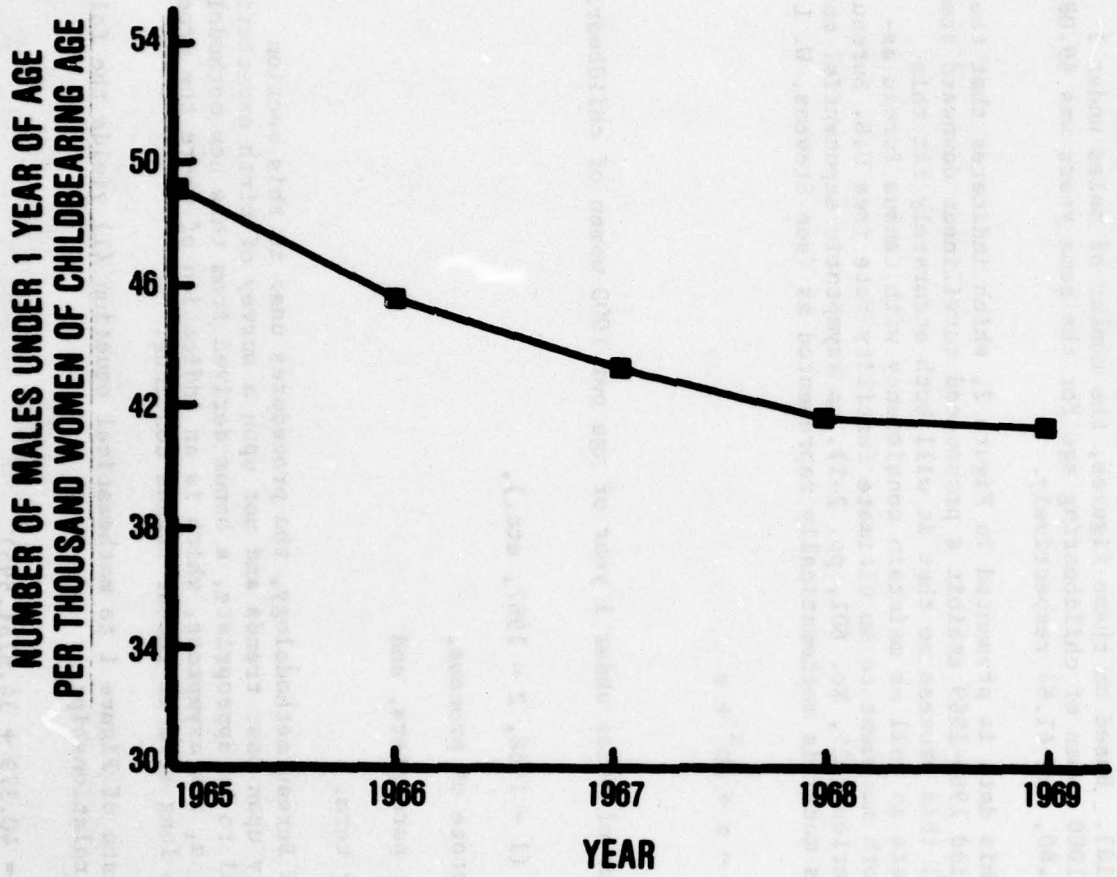

Figure 2. Actual Census Bureau estimates of number of males under 1 year of age per 1000 women of childbearing age (1965-1969).

Figure 3 illustrates the closeness of the fit between the 1965-1969 estimated and actual data. The projections of the number of males under 1 year old per 1000 females of childbearing age based upon equation (2) are also presented.

Once the projections of the number of males under 1 year old per 1000 females of childbearing age have been obtained, the projected number of males under 1 year old may be obtained by multiplying this figure by the projected number of females between 15 and 44 years of age for the corresponding year. Such projections are available as part of the Census Bureau's P-25 series and are quite accurate since, for the near term, they do not require the use of fertility rate assumptions as part of the projection methodology.

In order to now project the number of 18-year-old males 18 years beyond the date of projection, it is necessary to apply a survival factor to the projected number of under 1-year-old males. Life Tables from the HEW National Center for Health Statistics (see National Center for Health Statistics, Life Tables, 1975) estimate the stationary population of males under 1 year old to be 98,436. The estimated number of 100,000 males born who would reach their 18th birthday is estimated to be 96,774. As this survivorship rate has remained fairly constant historically, it will be assumed that it will stay the same in the near term. Therefore, the ratio of the above figures, 96,774 ÷ 98,436 = .983, is used as the survival factor. Multiplying the projections of under 1-year-old males by this factor yields projections of the number of 18-year-old males 18 years beyond the date of projection. Entirely analogous procedures may be used to project the total number of 17-year-old males, 19-year-old males, etc.

In summary, the methodology utilized to obtain projections of the 18-year-old male population is as follows:

1. Project the number of under 1-year-old males per 1000 females of childbearing age by extrapolation of the asymptotic trend model expressed by (1).

2. Project the number of under 1-year-old males by multiplying the projections obtained in 1 by the projected number of females of childbearing age ÷ 1000, obtained from the Census Bureau's P-25 Series.

3. Project the number of 18-year-old males 18 years beyond this projection date by applying the appropriate survival factor to the above projections.

To assess the accuracy of the above methodology, the projections obtained from equation (2) were compared with actual Census Bureau 1970-1975 post-period population estimates (see U.S. Bureau of the Census, Series P-25, No. 614) and with Census Bureau population projections made during 1970 (see U.S. Bureau of the Census, Series P-25, No. 448). These comparisons are presented in the next section. Additionally, the above steps are followed to determine projections of the 18-year-old male population for the period 1994-1998 on the basis of data obtained during the period 1971-1975. Census Bureau 1975 projections of this age group are also presented (see U.S. Bureau of the Census, Series P-25, No. 601).

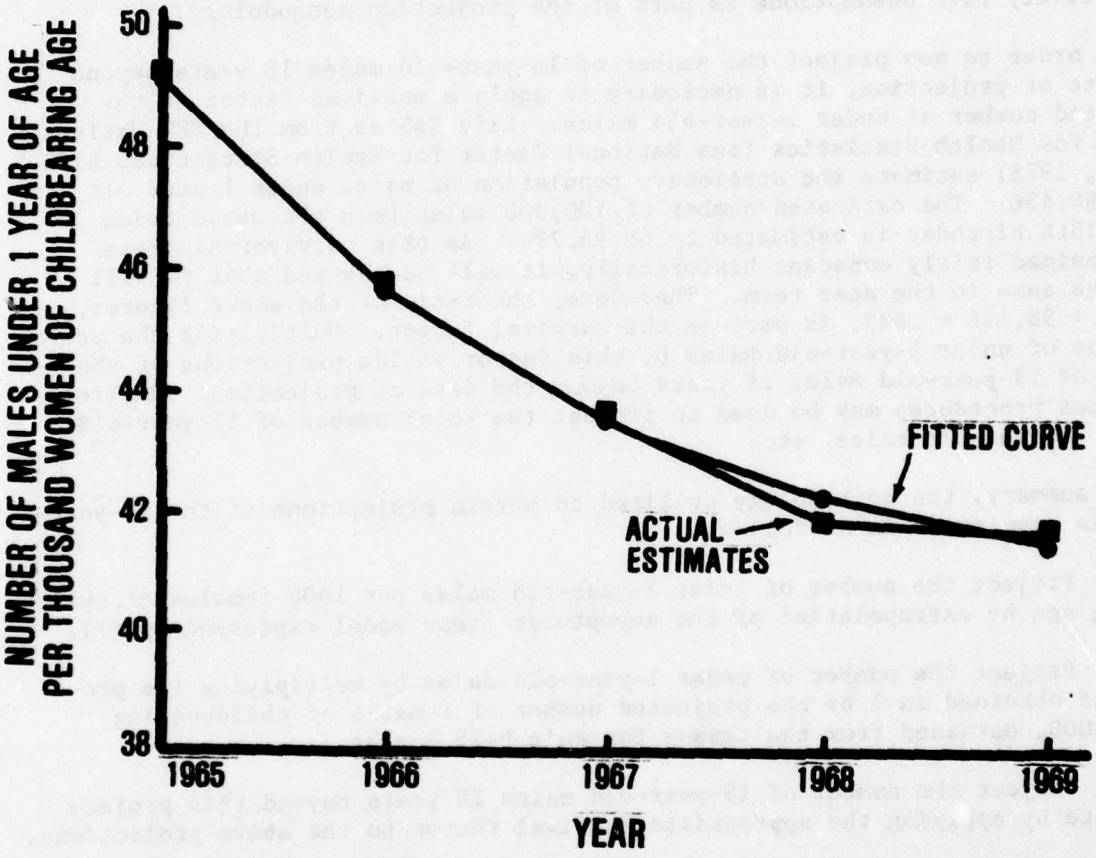

Figure 3. Comparison between actual Census Bureau post-period estimates and fitted asymptotic exponential trend curve (1965-1969).

RESULTS

This section presents the results obtained when utilizing the projection methodology discussed previously. The first part of this section computes projections based upon data obtained during 1965-1969 and compares them to the actual 1971-1975 post-period Census Bureau estimates and to 1970 Census Bureau projections. The second part computes projections of the 1994-1998 male 18-year-old population based upon data obtained during 1971-1975 and compares the results to corresponding Census Bureau projections.

Comparisons Between Asymptotic Exponential Trend Projections, Actual Census Bureau Post-Period Estimates, and 1970 Census Bureau Projections

Table 1 presents the actual 1970-1975 post-period Census Bureau estimates of the number of males under 1 year old and the number of females of childbearing age (15 to 44) (see U.S. Bureau of the Census, Series P-25, No. 614).

Table 1

U.S. Census Bureau Post-Period Estimates of Number of Males Under 1 Year Old and Number of Females Ages 15 to 44 (1970-1975)

Year	Number of Males Under 1 Year Old (in Thousands)	Number of Females 15 to 44 Years Old (in Thousands)
1970	1788	42,646
1971	1832	43,485
1972	1671	44,399
1973	1574	45,308
1974	1539	46,231
1975	1575	47,165

Post-period estimates of the number of males under 1 year old per 1000 women of childbearing age for the same years, calculated on the basis of the data appearing in Table 1 are 41.93, 42.13, 37.64, 34.74, 33.29, and 33.39 respectively. These data indicate that, during the 1970-1975 period, the fertility variable under study exhibited a pronounced downward decline.

The Census Bureau periodically releases population projections based upon various assumptions regarding fertility, mortality, and net immigration. The four regular series (B, C, D, and E), released in August 1970 (see U.S. Bureau of the Census, Series P-25, No. 448), differ only in the fertility assumptions

involved. For these series, it is assumed that, on the average, women will bear 3.10, 2.78, 2.45, and 2.11 children during their lifetime. For purposes of comparison with actual post-period estimates and with asymptotic exponential trend projections, the two middle Census Bureau projection series (Series C and D) are presented in Table 2.

Table 2

U.S. Census Bureau Projections of Number of Males Under 1 Year Old (in Thousands) (1970-1975)

Year	Series C	Series D
1970	1846	1749
1971	1911	1773
1972	1975	1816
1973	2039	1859
1974	2105	1901
1975	2174	1943

When the projections in Table 2 are normalized by the estimated number of females of childbearing age (see page 11), the figures appearing in Table 3 are obtained.

Table 3

U.S. Census Bureau Projections of Number of Males Under 1 Year Old Per 1000 Women of Childbearing Age (1970-1975)

Year	Series C	Series D
1970	43.3	41.0
1971	43.9	40.8
1972	44.5	40.9
1973	45.0	41.0
1974	45.6	41.1
1975	46.1	41.2

Projections of the number of males under 1 year old per 1000 women of childbearing age for 1970-1975, using the asymptotic exponential trend technique discussed in the previous section, are 41.0, 40.8, 40.6, 40.5, 40.5, and 40.4 respectively. The values $x = 6$, $x = 7$, ..., $x = 11$ are inserted into predictor equation (2), which was computed on the basis of 1965-1969 data in order to obtain projections for the period 1970-1975.

Table 4 compares the actual Census Bureau post-period population estimates, the asymptotic exponential trend projections, and the Census Bureau Series C and D projections. Also listed is the percentage error between the yearly population projections and the corresponding actual post-period estimates. The table indicates that all three projection series generally overestimated the actual results. However, the asymptotic trend and Census Bureau D series both appear to be substantially more accurate than the C series projections. The mean absolute error of the asymptotic trend projections was slightly lower than the Census Bureau D series.

Figure 4 provides a graphical comparison between the actual Census Bureau post-period estimates and the projections appearing in Table 4. Note the relatively steep decline in the actual data appearing during the 1971-1975 period. The actual process appears to have "shifted" downward from the exponential curve described during the 1965-1969 period. The exponential shape of the process, however, appears to be quite similar to the data pattern described during the 1965-1969 period.

Projections of the 1994-1998 Male 18-Year-Old Population

Projections of the 1994-1998 male 18-year-old population were made using the asymptotic exponential trend technique. The model described by (1) was fitted to the 1971-1975 period data provided on page 12, yielding the following estimated relationship:

$$\hat{Y} = 32.41092 + 19.28587(.50752)^{x}. \qquad (3)$$

The closeness of the fit between the 1971-1975 actual data points and the estimates obtained by (3) is presented in Figure 5.

The projections of the number of males under 1 year of age per 1000 females of childbearing age for the period 1976-1980 obtained from the asymptotic exponential trend equation are 32.74; 32.58; 32.50; 32.45; and 32.43 respectively. These results are obtained by substituting the values $x = 6$, $x = 7$, ..., $x = 10$ into predictor equation (3).

The projected number of women aged 15-44 for the years 1976-1980 (see U.S. Bureau of the Census, P-25, No. 601) are 48,131, 49,132, 50,082, 51,027, and 51,872 respectively.

Multiplying the corresponding yearly projections listed above yields the projected number of males under 1 year old; that is, 1,575,809; 1,600,721; 1,627,665; 1,655,826; and 1,682,209 for the years 1976-1980 respectively.

Table 4

Comparison Between Actual Post-Period Estimates, Asymptotic Exponential Trend Projections, and 1970 Census Bureau C and D Projection Series (1970-1975)

Series	Year						Average Absolute Error
	1970	1971	1972	1973	1974	1975	
Actual	41.9	42.1	37.6	34.7	33.3	33.4	
Asymptotic Trend	41.0	40.8	40.6	40.5	40.5	40.4	
(Percentage Error)	(-2%)	(-3%)	(+8%)	(+16%)	(+21%)	(+21%)	12%
Census Bureau - C Series	43.3	43.9	44.5	45.0	45.6	46.1	
(Percentage Error)	(+3%)	(+4%)	(+18%)	(+30%)	(+37%)	(+38%)	22%
Census Bureau - D Series	41.0	40.8	40.9	41.0	41.1	41.2	
(Percentage Error)	(-2%)	(-3%)	(+9%)	(+18%)	(+23%)	(+23%)	13%

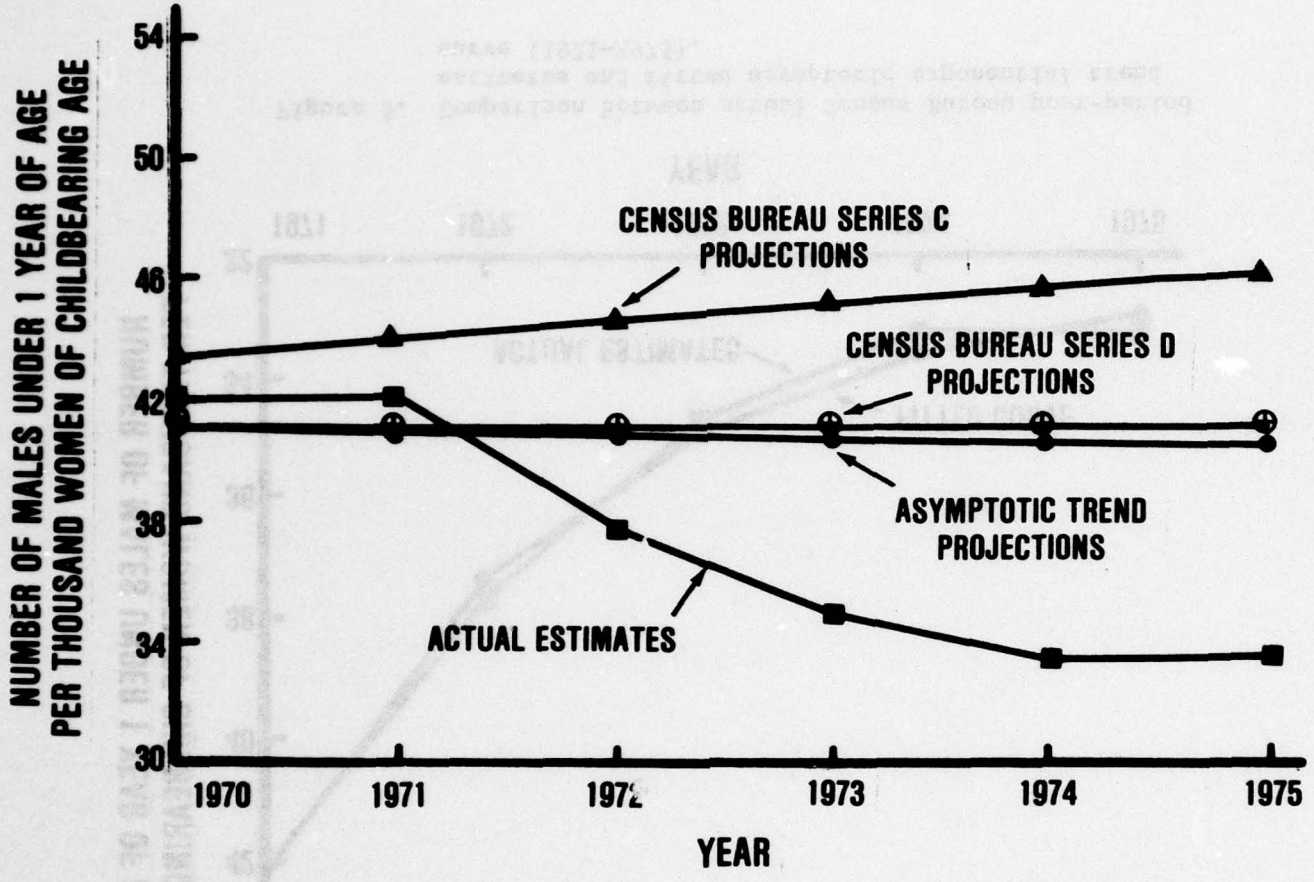

Figure 4. Comparison between actual Census Bureau post-period estimates and Census Bureau Series C Projections, Census Bureau Series D Projections, and Asymptotic Exponential Trend Projections (1970–1975).

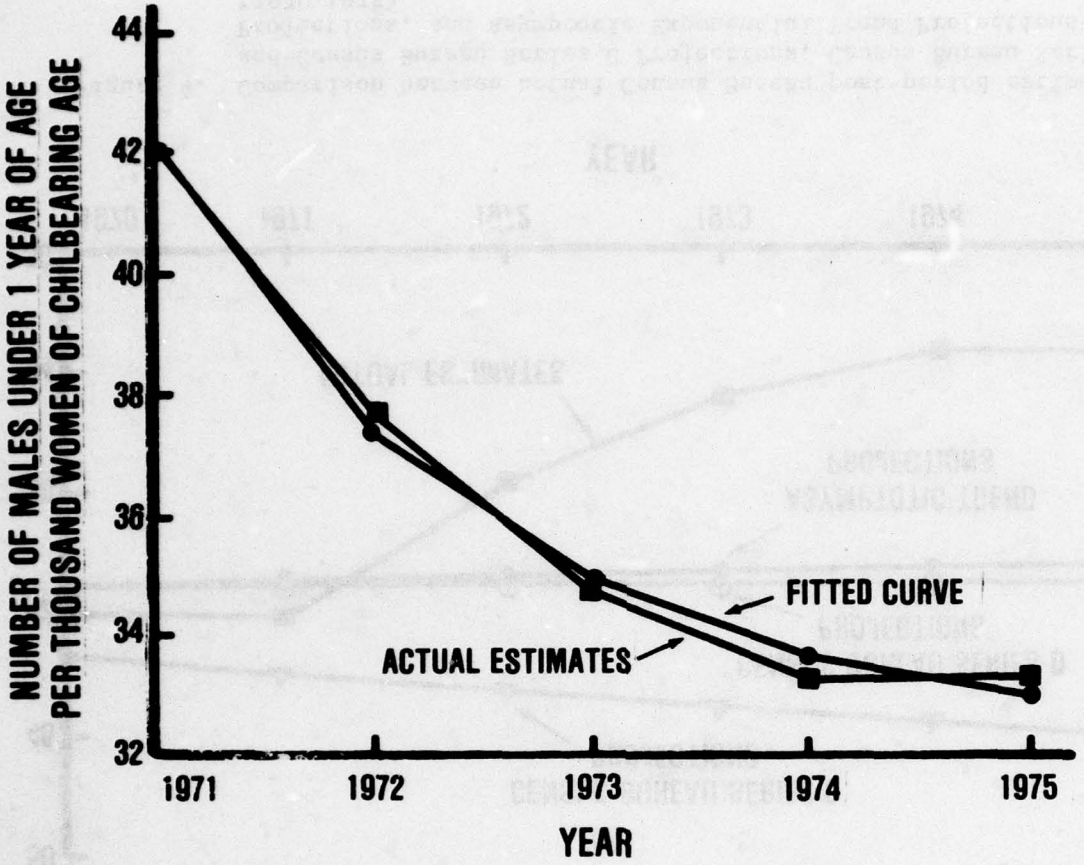

Figure 5. Comparison between actual Census Bureau post-period estimates and fitted asymptotic exponential trend curve (1971-1975).

Applying the survival factor .983 discussed in the previous section to the above projections yields the following asymptotic exponential trend projections of the number of 18-year-olds for the years 1994-1998: 1,549,020; 1,573,509; 1,599,995; 1,627,677; and 1,653,611 respectively.

The number of males 18 years of age in 1975 was estimated by the Census Bureau to be 2,148,000. Therefore, the asymptotic exponential trend projections appearing above indicate the number of 18-year-olds is likely to remain well below 1975 levels during the 1994-1998 period.

Table 5 presents a comparison between these asymptotic exponential trend projections and the Series II and Series III projections of the 1994-1998 male 18-year-old population made by the Census Bureau in 1975 (see U.S. Bureau of the Census, Series P-25, No. 601). Census Bureau Series II (middle series) assumes an average cohort fertility rate of 2.1 lifetime births, while Series III (low series) assumes an average cohort fertility rate of 1.7 lifetime births. The corresponding percentage declines from the 1975 level of male 18-year-olds are also indicated. The table shows the asymptotic exponential trend projections to be much closer to Series III than to Series II Census Bureau projections. From 1996 onward, the asymptotic exponential trend projections are somewhat lower than the Census Bureau Series III. A graphical comparison appears in Figure 6.

Table 5

Comparison Between Asymptotic Exponential Trend,
Census Bureau Series II, and Census Bureau Series III Projections
of Male 18-Year-Old Population

Series	Year				
	1994	1995	1996	1997	1998
Asymptotic Trend	1,549,020	1,573,509	1,599,995	1,627,677	1,653,611
(Percentage Decline from 1975)	(-27.9%)	(-26.7%)	(-25.5%)	(-24.2%)	(-23.0%)
Census Bureau - Series II	1,704,000	1,775,000	1,850,000	1,923,000	1,996,000
(Percentage Decline from 1975)	(-20.7%)	(-17.4%)	(-13.9%)	(-10.5%)	(-7.1%)
Census Bureau - Series III	1,533,000	1,540,000	1,607,000	1,673,000	1,723,000
(Percentage Decline from 1975)	(-28.6%)	(-28.3%)	(-25.2%)	(-22.1%)	(-19.8%)

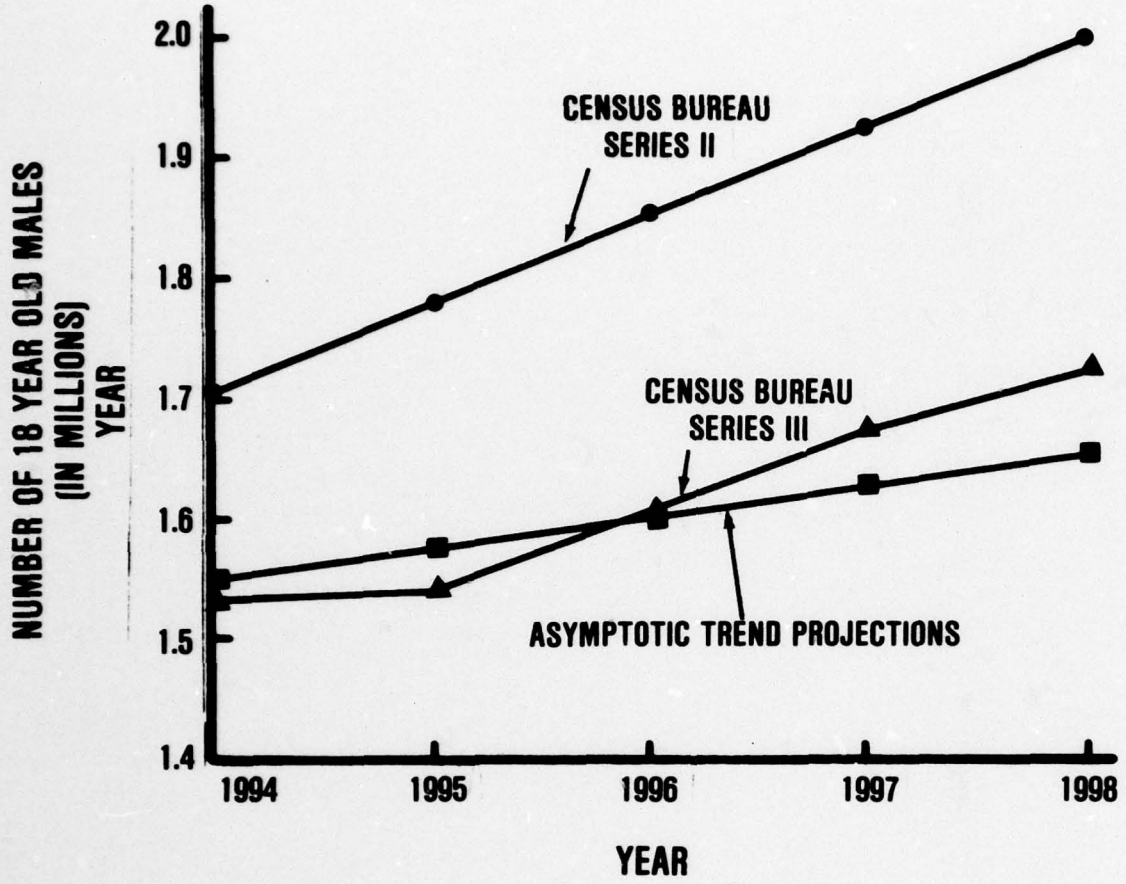

Figure 6. Comparison between asymptotic exponential trend; Census Bureau Series II and Census Bureau Series III: Projections of 18-year-old male population (1994-1998).

CONCLUSIONS

The short-range asymptotic exponential fertility trend model discussed in this report projects the size of the U.S. population of 18-year-old males to remain relatively low throughout the 1994-1998 period. The model forecasts a decline from 1975 levels of approximately 27.9 percent in 1994, moderating to a decline of approximately 23 percent by 1998. These results signal a significantly lower military manpower pool than Census Bureau projections based upon high and moderate fertility assumptions.

Based upon comparisons between 1970-1975 population projections and actual post-period population estimates, the asymptotic trend method of projection appears to be a reasonable alternative to U.S. Bureau of the Census methodology.

RECOMMENDATION

The methodology (or suitable modifications thereof) explored in this report should be seriously considered by military manpower planners when developing projections of future qualified military manpower supply and enlistments.

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